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San Francisco, California
1949

THE PAN-PACIFIC ENTOMOLOGIST

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NOTES ON NORTH AMERICAN POLISTES WITH DESCRIPTIONS OF NEW SPECIES AND SUBSPECIES

(Hymenoptera, Vespidae)

By Richard M. Bohart
University of California, Davis

The North American *Polistes* wasps can be divided taxonomically in to 4[1] species groups which are widely distributed over the country. These may be called the *canadensis*, *exclamans*, *fuscatus* and *major* groups. The structural characters on which they are based have been nicely summarized by Bequaert.[2] The first two can be distinguished from the last two by their more slender form and by the only slightly convex second tergite. The *canadensis* group is further characterized by the distinctly striate propodeum, well punctured mesopleuron and raised pronotal collar. In the *exclamans* group the propodeum is finely striate except in the median groove, the mesopleuron has microscopic punctures only, and the pronotal collar is low and blunt. The *major* group can be separated from the *fuscatus* group by the almost invariably present prepectal suture on the mesopleuron of the former. Also, in the males of the *fuscatus* group the apical sternite has a mediobasal tubercle.

Thanks are due the U. S. National Museum, American Museum of Natural History, California Academy of Sciences, University of California, and Oregon State Agricultural College for the opportunity of studying their extensive collections. Also, Dr. Joseph Bequaert of the Museum of Comparative Zoology at Harvard has contributed and loaned many specimens as well as furnished suggestions and criticisms based on his extensive knowledge of *Polistes*.

[1]A fifth group is represented by *P. pacificus* (Fabricius), a new record of which from Brownsville, Texas, has been communicated to me by Dr. Joseph Bequaert.

[2]Bequaert, J., 1940. An introductory study of *Polistes* in the United States and Canada with descriptions of some new North and South American forms. Jour. N. Y. Ent. Soc. 48:1-32.

Holotypes will be deposited in the California Academy of Sciences. Paratypes will be distributed to the above-named institutions as their number permits.

I. P. CANADENSIS GROUP

P. canadensis (Linn.) in its typical mahogany-colored form occurs in Central and South America. In the United States it is known only from southern Arizona. Other subspecies in this country are the brownish-red *kaibabensis* Hayward from Grand Canyon of Arizona, the yellow, black and orange *navajoe* Cresson from southwestern U. S., and in western Texas the largely orange and black *comanchus* Saussure. Another species of the group, *annularis* Linn. usually has a mahogany thorax and mostly black abdomen. It occurs commonly in eastern and midwestern U. S. and has previously been considered as a subspecies of *canadensis*. However, the male genitalia of *annularis* differ in having the aedeagus considerably stouter.

II. P. EXCLAMANS GROUP

Only one species of this group, *exclamans* Viereck, occurs in the U. S. Structurally speaking, it is separated with difficulty and by male facial characters only from related Mexican and Central American species. Specimens from Lower California appear to be *exclamans* but differ consistently in markings. These are described below.

Polistes exclamans lineonotus R. Bohart, new subspecies

Male—Black, marked with yellow and some reddish. Face mostly yellow, black across vertex and on occiput. Thorax with many yellow spots and lines including 2 pairs of lines on mesonotum and 2 pair on propodeum, pronotum partly reddish. Legs black and yellow or reddish-yellow, hind femora all black except for basal and apical spots. First 2 abdominal tergites mostly black with broad apical yellow bands, rest of abdomen mostly yellow tinged with reddish. Wings brownish red. Length to apex of second tergite 11.5 mm.

Female—Markings about as in male except as follows: face partly suffused with reddish, vertex reddish with black-rimmed ocelli, submedian yellow lines of mesonotum edged with red, mid femur all black except at apex, abdomen mostly brownish red with black at base of segments only, except on tergite I where it runs to apical yellow border. Apical margins of tergites II - III narrow and suffused with reddish, those following broader. Length to apex of second tergite 13.0 - 15.0 mm.

Holotype, male, C. A. S. No. 6002, 10 miles east of SAN IGNACIO, LOWER CALIFORNIA, September 30, 1941 (E. Ross and G. Bohart).

Paratypes, 30 females collected by E Ross, G. Bohart and A. Michelbacher from the following Lower California localities: San Domingo, Venancio, Concepcion Bay, 20 miles N. Comondu; 1 female collected by W. H. Mann at Loreto, Lower California.

The paired yellow lines on the mesonotum of this subspecies differentiate it from the typical form where such lines are absent or very indistinct.

III. P. FUSCATUS GROUP

Included here are *fuscatus* Fabricius from eastern U. S., *variatus* Cresson from central U. S. to the Rocky Mountains, *pallipes* Lepeletier from northern U. S., *centralis* Hayward from southwestern U. S., *aurifer* Saussure from far western U. S. and several localized named forms. These appear to be subspecies, and intermediates occur where they come together geographically. Also included as subspecies by Bequaert (1940, see footnote 2) were *rubiginosus* Lepeletier, *metricus* Say, *bellicosus* Cresson, *apachus* Saussure, *flavus* Cresson, and *hunteri* Bequaert. Although close to *fuscatus* and often structurally indistinguishable in the female, males of these species differ from each other as well as from *fuscatus* in the size and arrangement of the teeth of the aedeagus. The shape of the male clypeus and its position on the face are also useful differentiating characters. In *fuscatus* it is noticeably more concave than in the other species. An addition to the list is the following unnamed form.

Polistes rossi R. Bohart, new species

Male—Light brownish-red and yellow, black restricted to thoracic sutures, margins of ocelli, and mandible teeth. Yellow with orange tint, especially on abdomen, occurring as follows: Clypeus and frons to front of ocellus, anterior and posterior margins of pronotum, tegula basally, narrow propodeal stripes, spot above mid coxa, other indistinct areas on sides of thorax, tibiae and first 2 tarsal segments above, submedially emarginate apical margins of abdominal tergites, similar margins of sternites II - IV, indistinct free spot on tergite II. Wings pale reddish. Clypeus very slightly convex, apex produced at an angle of about 87° (less acute in some paratypes), distance between lateral ocellus and compound eye about 1.3 times diameter of front ocellus, distance between

antennal bases about 1.5 times diameter of front ocellus, last antennal segment in lateral view slightly convex beneath. Propodeum rather sharply cleft at middle, with about 25 distinct and well separated striae. Teeth of aedeagus small (as compared with *fuscatus*), shallow, set close together, similar in size. Length to apex of second tergite 13 mm.

Female—Marked about as in male except that face is yellowish red and propodeum is without stripes. Clypeus produced sharply so that angle is 90° or less. Distance between lateral ocellus and compound eye slightly less than twice diameter of front ocellus. Propodeum as in male but with striae as a rule even more distinct. Length to apex of second tergite 13.5 - 16.5 mm.

Type, male, C. A. S. No. 6003, 10 miles east of SAN IGNACIO, LOWER CALIFORNIA, September 30, 1941 (E. S. Ross and G. E. Bohart). Paratypes, 17 males and 9 females, collected by Ross and G. Bohart except as noted, all from Lower California: 10 mi. E. San Ignacio, 20 mi. S. El Arco, 20 mi. W. San Augustine, El Marmol, Cataviñia, Canipole, La Rivera, Concepcion Bay (Ross and A. Michelbacher), 15 mi. E. San Ignacio (Ross and A. Michelbacher).

This species occurs with a similarly marked subspecies of *fuscatus* which is probably referable to *centralis* but has the abdomen more reddish than in specimens from southwestern U. S. However, *rossi* can be separated on structural characters of the head and propodeum. In other species of the *fuscatus* group the lateral ocelli are separated from the compound eyes in the male by a little more than 2 front ocellus diameters, the male antennal bases are separated by about 2 front ocellus diameters and the last antennal segment in the male is concave beneath in profile. In the females of the other *fuscatus* group species, the clypeal apex is slightly obtuse, and the lateral ocelli are separated from the compound eyes by a little more than 2 ocellus diameters. The propodeum in the *fuscatus* group is subject to some variation in striae, and in *rubiginosus, apachus,* and *metricus* the ridges may be as strong as in some *rossi.* In the subspecies of *fuscatus,* however, fine striae only are found.

P. hunteri Bequaert was treated as a subspecies of *fuscatus* by Bequaert but the small and convex male clypeus and the minutely-toothed aedeagus are characteristic. The known forms of *hunteri* average smaller than any other North American *Polistes.*

In addition to typical *hunteri*, which ranges over much of eastern and southern U. S., there are at least 3 other subspecies. One of these, *neotropicus* Bequaert, notable for the large amount of yellow on the propodeum, was described from Central America but ranges into Texas, New Mexico, and southern Colorado. The other previously unnamed subspecies are described below.

Polistes hunteri californicus R. Bohart, new subspecies

Polistes fuscatus anaheimensis of authors (not Provancher)

Male—Light red marked with yellow as follows: Mandible mostly, face to near ocellar triangle, outer orbit narrowly above and broadly below, anterior and posterior margins of pronotum, spot below tegula, large mesosternal spot, 2 spots at front margin of scutellum, front margin of postscutellum, narrow propodeal stripes, membranous areas at abdominal insertion, front and mid coxae beneath, exterior stripes on femora and tibiae, tarsi partly, rather broad bands on abdominal segments, indented medially, most of tergites III to VII, attached spots on I and II. Black restricted to mandible teeth, irregular area around ocelli, stains along most thoracic sutures and spots on coxae above. Wings reddish, veins brown. Clypeus (as in typical subspecies) small, somewhat convex, removed from eye by about 1.5 times diameter of front ocellus; lateral ocellus removed from eye by about 3.5 times diameter of front ocellus. Last antennal segment not concave or shiny beneath. Aedeagus slender, with many small teeth of about equal size. Length to apex of second tergite 12.5 mm.

Female—Markings about as in male but with yellow more restricted. Most of face including part of clypeus often reddish, mesosternum, coxae and femora except at apex, without yellow. Clypeus adjoining compound eye for about 1 ocellus diameter, lateral ocellus removed from eye by about 3 times diameter of front ocellus. Length to apex of second tergite 10.0 to 14.0 mm.

Holotype, male, C. A. S. No. 6004, ANTIOCH, CONTRA COSTA CO., CALIF. (P. D. Hurd). *Paratypes*, 36 males and 88 females from the following California Counties: Solano (Green Valley), Shasta (Cottonwood), Yolo (Davis, Putah Canyon, Madison), Sacramento, (Sacramento), Stanislaus (Del Puerto Canyon), San Francisco (San Francisco), Eldorado (Chile Bar), Sonoma (Cloverdale), Contra Costa (Antioch), Napa (St. Helena), Lake (Middletown), Alameda (Tesla and Niles Canyon), Inyo (Big Pine), Santa Clara (Stanford University), Monterey (Paraiso Springs), Tulare (Sequoia Park), Madera (Bates), Fresno (Firebaugh), Los Angeles (Saugus, Sierra Madre, Pomona, West Los

Angeles), Orange (Silverado Canyon), Riverside (Andreas Canyon, Banning, Hemet), San Bernardino (El Cajon), San Diego (Borego, San Diego, San Felipe Valley, Jacumba).

The species is common in California at low to moderate elevations as far north as Shasta County. It hibernates particularly under loose bark of cottonwood or eucalyptus and in company with *P. fuscatus aurifer*. Both wasps are stylopized by *Xenos peckii* Kirby but *aurifer* much more frequently so. The nests of *californicus* are usually small but I have collected one containing about 250 cells. It was long oval in shape, with a double pedicel near the middle and individual cells measuring about 5.0 mm. in diameter.

Polistes hunteri clarionensis R. Bohart, new subspecies

Male—Body mostly dull brownish red with restricted yellow and black markings. Yellowish are: face as far up as eye emargination, mid and fore coxae mostly in front, indistinct lines on femora, margins of pronotum weakly, base of abdominal sternite II. Black are: large spot on vertex enclosing ocelli, fourth and following antennal segments except narrowly beneath, spot at middle of humeral slope, thoracic sutures including mesonotum all around and a median stripe extending back as far as tegulae, basal areas on tergites I and II, irregular areas on sternites. Wings reddish, veins brown. Structural characters as in *hunteri* and *californicus*. Length to apex of second tergite 12.0 mm.

Female—Markings about as in male except as follows: small black spot running from each antennal insertion to clypeus, fourth and following antennal segments all black except for tip of twelfth, mesonotum more extensively black, legs with yellow only at tips of fore and mid femora, abdominal tergites (in some paratypes) with traces of sublateral yellow spots. Length to apex of second tergite 12.0 - 16.0 mm.

Holotype, male, C. A. S. No. 6005, CLARION ISLAND, REVILLAGIGEDO GROUP, Pacific Ocean, April 27, 1925 (H. H. Keifer).

Paratypes, 8 males and 49 females, same data as type; 2 females, Clarion Island, March 22-24, 1932 (M. Willows, Jr.), 3 females, Clarion Island, February 27, 1928, (T. Craig).

This subspecies is easily recognized by the decidedly bicolored antennae, the all red propodeum except for a median black stripe, and the absence of yellow on the first abdominal tergite. Mr. H. H. Keifer has told me that nests were numerous near the ground in catsclaw bushes.

IV. P. MAJOR GROUP

Typical *P. major* Beauvois occurs in Mexico and Central America and occasional specimens have been taken in southern Arizona along with the much more common mahogany-colored subspecies, *castaneicolor* Bequaert. The typical subspecies also occurs at Brownsville, Texas, according to information received from J. Bequaert in a letter. In addition I have studied 8 specimens, including both sexes, which represent various intergrades between *major* and *castaneicolor* and which were collected with the other forms in Arizona. In western Texas there is a subspecies, *bakeri* Bequaert, characterized by extensive black areas on the thorax. In southeastern California, subspecies *palmarum* Bequaert can be recognized by its pale reddish color and somewhat restricted yellow markings. In Lower California a similar but more deeply colored subspecies occurs which is described below.

Polistes major slevini R. Bohart, new subspecies

Male—Orange red and yellow with restricted black markings. Mandible, clypeus and frons yellow, ocellar area and occiput irregularly blackened, rest of head reddish. Outlines of pronotum, spots on mesopleuron, coxae beneath, scutellum, postscutellum, area of abdominal insertion yellow, rest of thorax reddish except for blackened sutures, coxae partly and metapleural spots. Abdominal segments with bases of I and II narrowly black, rest reddish with broad apical yellow bands so that IV to VII appear all yellow. Wings reddish brown, veins brown. Length to apex of second tergite 15.0 mm.

Female—Markings about as in male except that ocellar black area is confined to rims of ocelli, scutellum sometimes with small reddish spots. Length to apex of second tergite 17.0 mm.

Holotype, male, C. A. S. No. 6006, LA PAZ, LOWER CALIFORNIA, June 28, 1919 (J. R. Slevin).

Paratypes, 1 male and 6 females from the following Lower California localities: Sierra de la Laguna, Agua Caliente, La Paz and Las Parras.

This subspecies by virtue of its reddish and yellow pattern most closely resembles *palmarum*. However, the red color is darker and the black markings of *slevini*, notably along the pleural sutures, toward the leg bases, at the middle of the propodeum, and at the base of tergites I and II, are absent in *palmarum*.

THE GENUS OROTHRIPS MOULTON

(Thysanoptera: Orothripini)

By Stanley F. Bailey

University of California, Davis

This paper is another in a series on the Aelothripoidea in which we are reviewing, illustrating, and making available all known information on various groups of thrips. Over a period of about forty years the majority of workers in this group of insects have concerned themselves chiefly with describing new species. In North America, particularly, enough is known of this order of insects now to begin bringing together and evaluating our knowledge of certain groups.

Since Moulton's original description of the genus *Orothrips* in 1907, based on *kelloggii*, this worker has described four additional species. It is interesting to note that, like *Erythrothrips*, this genus is also represented in India. In Australia[1], Europe and Africa these genera appear to be replaced by *Desmothrips* Hood, *Melanthrips* Hal., *Allelothrips* Bagn., and *Audiothrips* Moulton. It has been possible, through the kindness of Mr. Moulton, to study all the types of *Orothrips* which are in the Moulton collection and, in addition, the writer has collected and studied many hundred specimens of this genus from the western United States.

On the basis of the presently known species, the genus *Orothrips* is readily divided into two distinct groups, as was originally done by Moulton (1927), on the basis of the shape of the sensory areas on antennal segments III and IV. The value of this character, however, should not be over emphasized. Hood (1936) in his discussion of the new genus *Euceratothrips* was led "to the inescapable conclusion that sensoria are a minor, rather than a major, character in the definition of higher groups, and confirm the writer's repeated contention that such characters, though at once striking and distinctive, are of no great taxonomic moment."

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[1]*Orothrips australis* Bagn., 1914 = *Desmothrips*. Hood, 1915.
Orothrips propinquus Bagn., 1916 = *Desmothrips*. Bagnall, 1928.
Orothrips tenuicornis Bagn., 1916 = *Desmothrips*. ibid.
Orothrips unguttipennis Girault, 1926 = *Desmothrips bagnalli* Karny, 1920. Kelly and Mayne, 1934.

Further, as one studies the aeolothripids and attempts to weigh the better characters in evaluating valid, higher groups, genera and species, the studied opinion of Priesner (1936) can well be considered. This last-mentioned writer states that in studying *Aeolothrips* and employing the sensory areas on the antenna as a specific character "Caution is advocated since one encounters not uncommonly monstrous specimens, and the study of a series of examples is considered necessary to obtain a decision on the specific constancy of the organ in question."

The same author wrote (1936) "In *Melanthrips*, I have found the sensory organs of the 3rd and 4th antenal joint, in spite of certain variations, very reliable for the purpose of separating difficult species." Another character which Priesner found helpful in studying *Melanthrips*, as did the present writer in the case of *Dactuliothrips* and *Ankothrips* (papers previously published in this journal), is the chaetotaxy of the pronotum. So far, it has been unnecessary to use this character in separating *Orothrips* species.

The diversity of the type of sensory areas has been pointed out and illustrated by Priesner for *Melanthrips* in which there are nineteen species. It is possible, therefore, as more species of *Orothrips* become known, (although the genus appears to be a very small one) that the above-mentioned natural grouping may break down. Among various aberrant specimens, the writer has two specimens of *kelloggii* in which the two sensory areas are connected at the tip in the same manner as *Melanthrips nigricornis* Bagn. (see Priesner, 1936, Plate II, fig. 17). Also, we have one male specimen of *yosemitii* in which the sensory areas on segment IV are fused.

Further, on studying a long series of specimens, other variations or oddities are noted. An individual is seen now and then with the number of palpal segments reduced from seven to six, or with the number differing on each palpus of an individual specimen. We have pointed out already the variation in this character in our study of *Erythrothrips* (Bailey, 1947). We have one specimen of *O. yosemitii* with six cross veins on the right fore wing. In general, *Orothrips* collected in the northern portion of their range and at high elevations are darker in color than those taken in central and southern California at low elevation.

The undesirability of establishing families, and even higher categories, then becomes obvious when a few genera only are known which in turn are composed of only a few species, which are based sometimes on single specimens.

In the light of the above discussion, a redescription of the genus *Orothrips* is in order.

OROTHRIPS Moulton, 1907

Antennae nine-segmented, all segments freely articulated. Segments three and four each with two similar sensory areas. Ocelli present with interocellar bristles. Maxillary palpi geniculate and seven-segmented. Labial palpi four-segmented, plus a minute basal attachment. Prothorax wider than long and with a row of strong spines on posterior margin. Fore femora thickened in both sexes. All tibiae armed, the tip of the fore tibiae with two well-developed spines. Second segment of fore tarsus with finger-like hook. Wings present in both sexes, large, bluntly rounded at tip and gradually tapering to base, cross veins present. Fore wings with two broad, dark bands, one near center and one at tip. Scale and extreme basal portion somewhat darker colored than cross bands. Ovipositor upturned. Posterior three abdominal segments taper abruptly, dorsum of last segment not split. Male much smaller than female. Sensory areas on fourth antennal segment very large. Abdomen slender with first segment much longer than second. Genitalia without claspers.

Genotype: *Orothrips kelloggii* Moulton, 1907, by monotypy.

Within the two groups of this genus, species differentiation is difficult since *keeni*, *raoi*, and *variabilis* were described on minor differences in color and size. The species *keeni* was described as having sensory areas on antennal segment III one-quarter the length of the segment (or 21 microns) and those of segment IV two-fifths its length (or 31 microns). In a long series of *kelloggii*, which includes specimens from Canada, Oregon, Nevada, Arizona, and California, we find the variation in the length of antennal segment III to range from 91 to 130 microns and that of IV from 84 to 123 microns in length. The two sensory areas on each of these two segments are not the same length on each or both segments. Dependent upon the angle of the antenna in the balsam, the depth and density of the balsam, and the degree to which the transmitted light is focused, a variation in the length (and width) of these sensory areas is observed. In the specimens of *kelloggii* studied we have measured the shorter sense area in each case and record the variation of this structure on segments III and IV

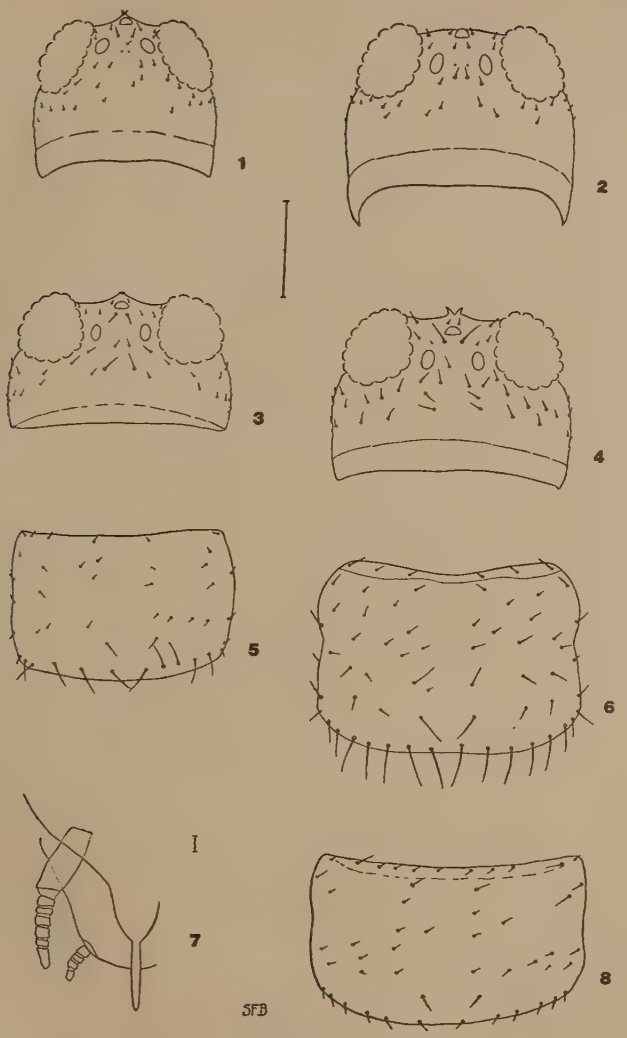

PLATE I

Orothrips. Dorsum of head of: 1, *yosemitii;* 2, *raoi;* 3, *keeni;* 4, *kelloggii.* Pronotum of: 5, *keeni;* 6, *kelloggii;* 8, *yosemitii.* Figure 7, maxillary and labial palpi of *yosemitii.* Scale: Figure 7, line equals 0.01 mm. Figures 1-6, 8, line equals 0.1 mm.

to be from 33 to 49 microns. In general, specimens of aeolothripids nearly always exhibit considerable reddish pigment as well as varying degrees of contrast in grey, black and white on the wings. Further, it should be noted that some years and some individual collections, are more robust, or small, in relation to what might be established as "average." On this basis one might set up varieties of forms which in such a distinctive, small genus is undesirable. The smaller antenna and the differences in the chaetotaxy of the head and pronotum (see figures 3 and 5), when compared with *kelloggii,* appear to set *keeni* apart as a distinct species. However, a series of specimens should be studied to confirm this conclusion and to present more complete knowledge of the extreme variations within the species. We recently collected on *Prunus* at Klamath Falls, Oregon, the type locality of *keeni,* but took only *yosemitii.*

Over a period of years, the writer has collected large numbers of specimens of *Orothrips* in Vacaville and vicinity, the type locality of *variabilis,* but has never been positive of the identity of this species. The species *yosemitii* exhibits the following variations in length in antennal segments: III, 71 to 97 microns; IV, 65 to 84 microns. It will be noted that the measurements given for these segments in *variabilis* by Moulton fall within the extremes. Also, there is as much as fifty per cent variation in the diameter of the oval sensory areas on segment III of *yosemitii.*

The only other known species with oval sensory areas, *raoi* from India, likewise is almost identical with *yosemitii.* A study of a series of exotic specimens in the future may bring forward sufficiently distinctive characters to make more accurate separation possible. At present we are able to give only a provisional key to the described species. While the key to the species given below is based largely on the sensory areas and length of antennal segments III and IV, there seems to be no other way to separate these species at present. In the illustrations accompanying this paper, the similarity of the head of *raoi* and *yosemitii* will be

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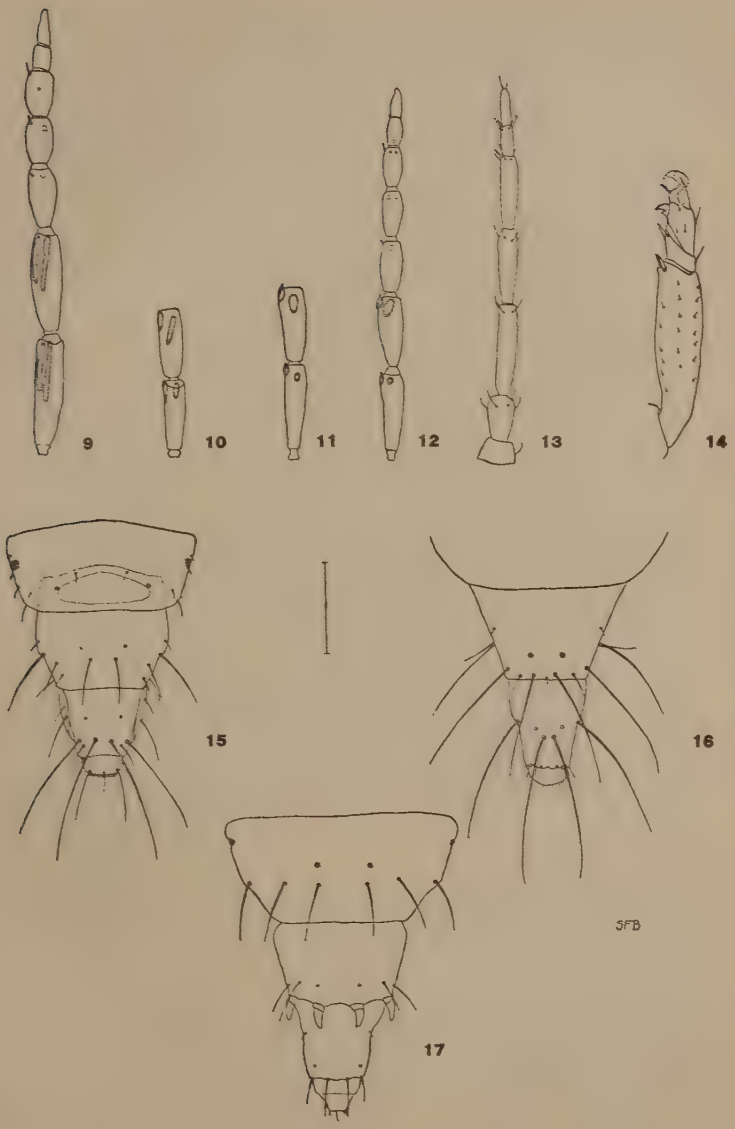
PLATE II

Orothrips. Antenna of: 9, *kelloggii* (segments 3-9); 10, *keeni* (segments 3 and 4); 11, *raoi* (segments 3 and 4); 12, *yosemitii* (segments 3-9); 13, mature larva of *yosemitii.* Figure 14, front tarsus of *yosemitii.* Terminal (dorsal) abdominal segments of: 15, *kelloggii,* male; 16, *yosemitii,* female; 17, *kelloggii,* mature larva. Scale: Figure 9-17, line equals 0.1 mm.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noted. There is even a greater similarity in the pronotum of these two species. The type slide of *variabilis* has two specimens mounted thereon, one laterally and one dorsally. We consider *variabilis* to be a synonym of *yosemitii* as it falls into the extreme range of color and size when a long series is studied. There are insufficient outstanding characters on the terminal abdominal segments to enable one to construct a key to the males. Furthermore, the males of *keeni* and *raoi* are unknown.

Provisional Key to the Species of Orothrips

1. Sensory areas on antennal segments III and IV elongated and definitely linear, two to each segment 2
– Sensory areas on antennal segments III and IV round or oval, two to each segment 3
2. Sensory areas on antennal segment III about one-fourth length of segment which is about 84 microns in length. Antennal segment II brown in color similar to body, segment III light brown in basal third. Total body length about 1.6 mm..... *O. keeni* Moulton, 1927 (W. No. America)
– Sensory areas (about 50 microns in length) on antennal segment III extending nearly to center of segment which is 91 to 130 microns in length. Antennal segment II brown or with tip light brown, segment III yellowish brown in basal half. Remainder of segments brown. Total body length about 2.4 mm..... *O. kelloggii* Moulton, 1907. (W. No. America)
3. Sensory areas on antennal segment III almost equal in size, irregularly oval and the smaller one from 9 to 13 microns long by 6 to 11 microns wide. Antennal segment II dark brown at base shading to yellowish brown at tip, segment III yellow to yellowish brown in basal half. Remainder of segments brown. Antennal segment III, 71 to 97 microns in length. Total body length about 1.6 mm ..... *O. yosemitii*[2] Moulton, 1911 ..... and *O. variabilis* Moulton, 1927 (W. No. America)
– Sensory areas on antennal segments III and IV oval, and nearly all equal in size. Length of antennal segment III, 105 microns. Total body length 1.58 mm..... *O. raoi* Moulton, 1927 (India)

Catalog of the Species of Orothrips Moulton, 1907

1. KEENI Moulton. 1927. North America. Oregon: Klamath Falls. *Prunus emarginata*. May. Known from original collection only. Slide No. 902. Holotype.

2. KELLOGGII Moulton, 1907. Genotype. North America. British

[2]The original spelling of this name by Moulton has been retained rather than that used by the same writer in 1927 (i.e. *yosemitei*).

Columbia, Oregon, Arizona, California: Widely distributed. Manzanita and madrone blossoms, Arbutus, plum and *Prunus demissa.* January to June. Slide No. 179 ("holotype"), 2 females.

New records: Talent, Oregon, plum, March 5, 1941. L. G. Gentner. Prescott, Arizona, manzanita, March 2, 1925. W. W. Jones. Bayles, California, manzanita, March 16, 1939. A. T. McClay. Huntington Lake, California, manzanita, June 27, 1948. A. T. McClay. Malahat, Vancouver Island, B. C., madrone, June 17, 1948. S. F. Bailey.

3. RAOI Moulton, 1927. India, Bangalore. Host plant unknown. Known only from original collection. Holotype slide No. 1226.

4. YOSEMITII Moulton, 1911. North America. British Columbia, Wyoming, Oregon, Washington, California: Widely distributed in foothills to 8100 feet elevation. *Amelanchier,* grass and flowers of live oak, *Ceanothus,* Manzanita and plum. March to July. (One collection only of "variabilis" is known, i.e. Vacaville, California, from Cherry blossoms in May). Slide No. 101 ("holotype"), 2 females. "Holotype" slide of *variabilis,* with no number, is of two females also.

New records: Pospect, Oregon, sweeping, June, 1938. A. T. McClay. Klamath Falls, Oregon, *Prunus demissa,* June 10, 1948. S. F. Bailey. Mt. Rainer Nat'l. Park (East side), Wn., flowering shrub, June 19, 1948. S. F. Bailey. Satus Pass, Wn., *Ceanothus;* June 19, 1948. S. F. Bailey. Russellman Park, Mt. Diablo, California, sweeping grass, April 8, 1936. S. F. Bailey. Emerald Bay, Lake Tahoe, California, *Ceanothus,* July 7, 1939. S. F. Bailey. Kit Carson Pass, California, sweeping wild flowers, July 1, 1936. S. F. Bailey. Cajon Pass, California, *Ceanothus,* April 12, 1936. R. M. Bohart. Jenny Lake, Wyoming, *Ceanothus,* June 21, 1940. G. F. Knowlton.

Like most of the aeolothripoid members of this group of insects, *Orothrips* species reach their greatest seasonal abundance in the spring. The first species to appear is *kelloggii* which may be found as early as December in the blossoms of manzanita and madrone, chiefly at low elevations. As these hosts continue to bloom, northward and upward, we have found this thrips as late as May and as high as 7000 feet. The adults oviposit in the flowers and the larvae feed therein (Moulton, 1927). When fullgrown, the yellow larvae (with distinct pink bands around the abdominal segments) drop to the soil beneath the hosts. After finding a suitable crevice several inches below the surface, they spin a cocoon

(Bailey, 1940) and there pass the remainder of the year. The other common species, *yosemitii*, has a similar seasonal cycle and habits. It is found chiefly in *Ceanothus* flowers and appears from March at lower elevations to July in the high mountains. Its distribution appears to be limited by that of *Ceanothus* species on which it has been collected up to 8100 feet elevation. Both of the above discussed species are very common and undoubtedly occur throughout the far western states. These thrips have only one generation a year.

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STUDIES ON THE COLEOPTERA OF THE PACIFIC NORTHWEST I

BY MELVILLE H. HATCH
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The author is working on a handbook of the Coleoptera of the Pacific Northwest. It is his intention to publish under the above title such bibliographic and taxonomic notes, including new species, as come to his attention, in order that the pages of his book may be kept free from such specialized material. Unless otherwise noted, the specimens on which these studies are based are in the collection of the author at the University of Washington.

CICINDELIDAE

CICINDELA LIMBALIS var. ELDORENSIS Csy.

This species is cited by Blackwelder in the Fourth Supplement to the Leng Catalogue (1939, p. 7) from "Ore." in error. The type locality is Eldora, Colorado.

CICINDELA COLUMBICA Hatch

Hatch, Univ. Wash. Publ. Biol. V, 1938, p. 234. I am now convinced this form has no special affinity with *bellissima* Leng. It most closely resembles *repanda* Dej., from which it is distinguished by the obtusely rather than subrectangularly angulate median elytral band.

CARABIDAE: CARABINAE

SCAPHINOTUS (PSEUDONOMARETUS) MERKELI Horn.

Roeschke, Ann. Mus. Nat. Hungarici V, 1907, p. 161, regards *idahoensis* Webb as a geographical race. I find the *merkeli*-form from the western portion of St. Joe National Forest, a point between the type locality of *idahoensis* near Moscow and the western portion of Coeur d'Alene National Forest, whence I have a least subtypical *idahoensis*. Accordingly, I reduce *idahoensis* to the status of a variety.

SCAPHINOTUS (NEOCYCHRUS) ANGULATUS Harris var. MARITIMUS Van Dyke

Van Dyke, Ent. Amer. XXIV, 1944, p. 12, reports this black phase of *angulatus* from Port Angeles, Olympic National Forest,

Hoquiam, and Melbourne, and regards it as a geographical subspecies. I have a single specimen from Seattle, where typical *angulatus* occurs, so that I suspect it is a nongeographical variety.

Cychrus (Cychrus) rickseckeri LeC.

In view of the fact that the range of this form (Idaho north of Coeur d'Alene and adjacent portions of Washington, British Columbia, and Montana) is separated by three or four hundred miles from that of *hemphillii* Horn, I suggest we return to LeConte's original conception of it as a distinct species.

Carabus (Megodontus) vietinghoffi Ad.

Horn, Can. Ent. VIII, 1876, p. 127, says "this species is found in Alaska and extends its habitat *towards* British Columbia . . ." (italics mine), but this is an insufficient basis for listing it *from* British Columbia as is done by Breuning, Mon. Gatt. Carabus, 1935, p. 1212, and Blackwelder, Fourth Suppl. Leng Cat. Col. Am. n. of Mex., 1939, p. 11.

Blethisa oregonensis LeC.
(*columbica* Csy.)

Horn, Trans. Am. Ent. Soc. V, 1876, p. 247, distinguished *oregonensis* from *B. multipunctata* L. on the basis of the smooth ventral surface of the prothorax. Casey, Can. Ent. XLI, 1909, p. 277, described *columbica* with the prosternal side pieces punctate behind. My series shows variation from the virtually impunctate condition to one in which the side pieces are densely punctate except along the apical margin, a close approach to my examples of *multipunctata,* in which the entire side piece is densely and in part confluently punctate.

Notiophilus lanei Hatch, *sp. n.*

Dark bronze above, shining, elytra at times with an obscure lateral pale vitta that is usually apical but may be nearly entire, below shining black, the four basal antennal segments and legs, especially the tibiae, somewhat paler; head with front with five entire striae between the broad lateral grooves, the vertex opaquely alutaceous; pronotum three-fifths as long as wide, the sides broadly feebly arcuate in front, feebly sinuate before the rectangular hind angles, the disc broadly impunctate, the margins coarsely punctate or punctato-rugose, the basal impressions large and densely punctate and alutaceous; elytra coarsely punctato-striate, the second

and third striae fine towards apex, the second stria equidistant between the first and fifth, the apex alutaceous and with two ocellate punctures, the second to sixth intervals not or just visibly alutaceous, the third interval with a single dorsal puncture behind the basal fourth; length 4.5 - 5 mm.

Type and six *paratypes*: PIERCE, IDAHO, August 30, 1933; M. H. Hatch. One paratype: Waha, Idaho, August 31, 1933; M. H. Hatch; one paratype: Bobs L., B. C., June 13, 1939. Named in honor of Mr. M. C. Lane, with whom the specimens were taken.

In Fall's key, Psyche XIII, 1906, p. 82, this species comes between *simulator* Fall and *novemstriatus* LeC. From both of these and from *sylvaticus* Esch. it is distinguished by the position of the second elytral stria midway between the first and fifth. From *simulator* it is distinguished further by its more coarsely punctate more deeply impressed elytral striae and from *novemstriatus* by its larger size. Feebly vittate examples are distinguished from the strongly vittate *sylvaticus* by the virtually smooth or very feebly alutaceous second to sixth elytral intervals, which are evidently alutaceous in that species.

LEISTUS FERRUGINOSUS Mann.

According to Bänninger's key, Ent. Mitteil. XIV, 1925, p. 332, this species belongs in the subgenus *Leistophorus* Reitter and not in *Leistidius* Daniel, as Bänninger surmizes (p. 335). I can discover no reason for maintaining *nigropiceus* Csy., Mem. Col IV, 1913, p. 45, as distinct. Both are amply distinct from the European *L.* (*Leistidius*) *piceus* Froh., recorded probably on the basis of an adventitious specimen from Fitchburg, Massachusetts by LeConte, Trans. Am. Ent. Soc. V, 1875, p. 169.* In *piceus* the elytral humeri are oblique and virtually obsolete, the sides of the pronotum in front of the obtuse hind angles obliquely sinuate. *Ferruginosus* has the humeri well developed and arcuate, the sides of the pronotum in front of the sharply rectangular hind angles subparallel and strongly sinuate.

Nebria melanaria Hatch, *sp. n.*

Black, head between eyes with two rufous spots; pronotum with side margins widely reflexed, with a seta-bearing puncture at each hind angle and along either lateral margin in front of middle (seta broken in paratype), the side margins obliquely slightly

*C. H. Frost (*in litt.*) states that he knows of no other specimens from New England.

divergent in front of the acute hind angles; elytra with well developed humeri, the finely punctate striae finely impressed, the intervals flat or feebly convex, the third and seventh intervals with three to five dorsal punctures, these sometimes producing a subcatenate appearance, the fifth interval without or with a single dorsal puncture; abdominal sternites three to five with two or three seta-bearing punctures on each side of the middle along the posterior margin; length 10.5 - 11 mm.

Type and *paratype* male: GLACIER NATIONAL PARK, MONTANA, Going-to-the-Sun Chalet, August 26, 1939, M. H. Hatch. Except for its black color, this species resembles *gebleri* Dej., with specimens of which it was taken under stones on the beach of St. Mary Lake. It may be a variety of that species, but I know of no other instance in which one of the metallic species of *Nebria* loses its metallic color. In Hatch's key, Pan-Pac. Ent. XV, 1939, pp. 117-122, it runs to *trifaria* LeC. and *vandykei* Bänn., from which it is distinguished in part by its smaller size, more prominent elytral humeri, and less strongly catenate elytral intervals.

Dyschirius subpunctatus Hatch, *sp. n.*

Black, shining, above bronzed or cyanescent, base of antennae and legs more or less rufous; head with clypeus broadly emarginate, the bottom of the emargination feebly arcuate to evidently lobed, the front finely transversely impressed; pronotum globose, as long as wide, the apical and basal transverse impressions and the median line evident; elytra not margined at base, eight striate, the first seven well impressed, obsolete towards extreme base, well impressed at apex, finely sparsely punctate at base, impunctate behind middle, the third interval with an ante-median and a posterior setigerous puncture near the third stria, the humeri well developed; protibiae not dentate without; length 3.8 - 4.7 mm.

Type and 62 *paratypes*: VANTAGE, WASHINGTON, April 24, 1936, M. H. Hatch. 12 paratypes: Lyons Ferry, Wash., September 16, 1930, M. H. Hatch. 16 paratypes: Cicero, Fort Canby, Kittitas, Ocean Park, Orting, Renton, Vantage, and Vila in Washington. Four paratypes: Condon, Multnomah Falls, Salem, Tygh Valley in Oregon. The Vantage and Lyons Ferry specimens were obtained by washing water over sand banks by the river.

Distinguished from the eastern *sphaericollis* Say by the smaller punctures of the elytral striae.

Dyschirius thompsoni Hatch, *sp. n.*

Black, shining, legs and antennae more or less obscure rufous; head with clypeus broadly emarginate, the bottom of the emargination nearly straight, the angles prominently narrowly lobately rounded, the front with a deep transverse impression that is narrowly interrupted at middle; pronotum quadrately globose, nine-tenths as wide as long, the apical transverse impression and median line feeble, the basal transverse impression deep; elytra not margined at base, seven striate, the sutural stria deeply impressed, striae two to seven finely impressed, obsolete towards extreme base and feeble towards apex, finely distantly punctate on basal half, evanescently punctate behind middle, without dorsal punctures, the humeri well developed; protibiae more or less finely dentate without; length 2.75 - 3 mm.

Type and five *paratypes*: CONDON, OREGON, June 20, 1938, M. H. Hatch. Two paratypes: Lyons Ferry Wash., September 16, 1930, M. H. Hatch; Walla Walla, Wash., IV-1-10-1943, flying M. C. Lane. This species appears to run most closely to *aratus* LeC. from California in LeConte's key (Bull. Brooklyn Ent. Soc. II, 1879, pp. 18, 31), which is described with the "clypeus sharply bidentate." Named in honor of Prof. B. G. Thompson of the Oregon State College, whose guest I was when the type series was collected and to whom I am indebted for numerous other entomological favors.

Dyschirius alternatus Hatch, *sp. n.*

Piceous black, shining, elytra and abdomen black, legs and antennae more or less rufous; head with clypeus broadly emarginate, the bottom of the emargination straight, the angles prominently produced and acute, the front with a transverse impression; pronotum globose, nearly as long as wide, the anterior transverse impression and the median line feeble, the transverse basal impression distinct; elytra not margined at base, seven striate; the sutural stria distinctly impressed; second, third, and fourth striae feebly impressed; the striae coarsely distantly punctate on basal half, the striae beyond the second virtually effaced apically; fifth, sixth, and seventh striae unimpressed series of punctures; first third, fifth, and seventh intervals and impressed marginal stria with series of minute setigerous punctures; humeri well developed; protibiae minutely dentate without; length 2.25 mm.

Type: GRAND COULEE, WASHINGTON, Dry Falls, May 1, 1937, M. H. Hatch. Runs to the eastern *setosus* LeC. in LeConte's key (l.c.) from which it is separated by its smaller size.

CLIVINA FOSSOR L.

elongata Randall, Boston Jour. Nat. Hist. II, 1938, p. 34.
var. ♀ *collaris* Hbst., Jeannel, Faune de France 39, 1941, p. 257.

This widely distributed Palaearctic species was apparently introduced over a century ago at Boston, Mass. (Randall, l.c.). It has since been recorded from Cincinnati (Dury, Jour. Cinc. Soc. Nat. Hist. II, 1879, p. 162), Montreal (Fall, Ent. News XXXIII, 1922, p. 162), and Mobile (Loding, Geol. Surv. Alab. Mon. 11, 1945, p. 12). In northeastern North America it is still apparently rare, since C. H. Frost writes me that the only American examples in his collection are two specimens of *collaris* taken at Stoneham, Mass., around 1902 to 1908 and two specimens of *fossor* from Dartmouth, Nova Scotia taken in 1947. This species was taken first in western Washington in 1937 (Bothell), in 1938 at Juanita Beach near Seattle, at Seattle in 1941, at Renton near Seattle in 1944. Fall's notes will enable its tolerably certain recognition. In addition I have found the anteriorly feebly arcuate distinctly convergent side margins of the pronotum useful in distinguishing it from *impressifrons* LeC. and *oregona* Fall. Specimens approximating the *collaris*-form are present in my series.

SCHIZOGENIUS DEPRESSUS LeC.

I find the rufous and black forms together so regularly in Oregon and Washington that I suspect that the black *litigiosus* Fall is simply a color phase of *depressus*.

A NOTE ON SIREX AREOLATUS (CRESSON)
(Hymenoptera, Siricidae)

In removing some small (10 inches in diameter) Douglas fir stumps which had been buried for about a year by a loose fill, a number of individuals of this species were found in the pupa stage and some recently transformed adults. Some of the pupal cells were in the soggy sapwood, but some of the larvae had emerged from the wood and transformed in the soil.

Such a procedure seems strange for Siricidae and no such habit seems to have been reported.

Perhaps it is merely a case of our observations not having been very thorough.—W. J. CHAMBERLIN, *Oregon State College.*

DESCRIPTIONS OF SOME WESTERN LIMNEPHILIDAE
(Trichoptera)

BY HERBERT H. ROSS
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The species recorded in this paper come chiefly from the Cascade Mountain region of Oregon and Washington. I am deeply indebted to Kenneth M. Fender, Stanley G. Jewett, and Hugh B. Leech for procuring most of the material on which the paper is based. Types are deposited in the collections of the Illinois Natural History Survey (INHS) or the California Academy of Sciences (CAS).

LIMNEPHILUS Leach

Limnephilus lopho Ross, new species

This species is most closely related to *cockerelli* Banks and *harrimani* Banks, the male differing from both in having the cerci shorter than the lobes of the tenth tergite, and in the very distinctive feature of possessing a large, padlike, sclerotized lateral lobe which appears as a ventrolateral subdivision of each lobe of the tenth tergite, fig. 1.

Male—Length 13 mm. Head, scape, body, and legs to tip of femora dark brown; flagellum, palpi, and legs beyond femora, very pale brown, the legs with black spines; wings light brown with darker brown markings along the veins and along the posterior edge. General structure typical for genus. Head bears one large and several small pale macrochaetae mesad of, and slightly posterior to, each lateral ocellus. Pronotum bears many stout macrochaetae. Front legs have a row of minute black spicules on the ventral margin of the femur, starting at the base and gradually fading out about halfway to the apex; basitarsus one and one half times the length of succeeding segment. All legs with apical segment of tarsus having none to three short black spines; in one series of five specimens, two individuals have no spines on any apical segments. Eighth tergite with only a few scattered short setae on apical margin, its meson not produced into a lobe.

Genitalia as in figs. 1, 1*A*, and 1*B*. Ninth segment narrow both dorsad and ventrad but fairly long along the lateral dimensions. Cerci not extending posteriad as far as lobes of tenth tergite; each cercus in lateral view is almost parallel-sided, moderately wide

and rounded at apex, bearing a scattering of long setae; from dorsal view each is slightly thickened at base, rounded at apex, and bears a heavily sclerotized mesal area toward the tip. Claspers reduced to a small triangular lobe with a short posterodorsal projection and bearing about eight long, black, slender setae in addition to the shorter vestiture. Each lobe of tenth tergite has a long, deep, dorsal portion, its posterior margin oblique and almost straight, its upper corner fairly sharp, the posterior half of the lobe heavily sclerotized; below and to the side of this dorsal lobe is a smaller, flat, padlike structure also heavily sclerotized and reticulate; in uncleared specimens, this lobe fits tightly against the dorsal lobe and is easily overlooked. Aedeagus elongate, fig. 1*B*, the central portion slightly swollen at base and curved up into an ovoid tip; each lateral arm is heavily sclerotized, and bent up sharply at the apex, the apex bearing a thick brush of moderately long and stout hairs.

Female—Length 14 mm. Color, including wings, mostly tawny with scattered areas of darker brown, and with the dorsum of abdomen and venter of both thorax and abdomen moderately dark brown. General structure typical for genus. Genitalia as in figs. 1*C* and 1*D*. Subgenital plate with narrow mesal tongue, lateral lobes with ventral flap overlying most of dorsal flap. Ninth segment narrow dorsally, the ventral portion forming a single broad area slightly incised on the meson at apex. Cerci large, fused at base with base of tenth segment. Tenth segment with dorsum sharply notched for a short distance, the ventral portion incised almost to base and thus forming what appear as two sclerotized lateral flaps.

Holotype, male, Hood River Meadows, Mt. Hood, Oregon, July 17, 1948, K. M. Fender (INHS).

Allotype, female, Mt. Hood Meadows, Mt. Hood, Oregon, July 31, 1948, K. M. Fender (INHS).

Paratypes, same data as for holotype, 4♂; same data as for allotype, 13♂, 16♀. Paratypes are deposited in the collections of the California Academy of Sciences and the Illinois Natural History Survey.

Limnephilus santanus Ross, new species

On the basis of general appearance and size, this species appears related to *fumosus* Banks. The female of *santanus* differs from the female type of *fumosus* in the structure of the subgenital plate and in having the long dorsal processes of the tenth segment slender and light rather than heavily sclerotized and bladelike.

Male—Length 18 mm. Head and thorax dark brown, almost black, with a few lighter brown areas along the sutures; antennae dark brown with the apex of each segment lighter; palpi and mouth parts yellow, as is the adjacent area of the head; legs below coxae yellow with black spines; abdomen a moderate shade of brown; front wings chocolate brown with conspicuous straw-colored clear areas, including large spots at the end of cells R_5, M_2, and M_3, at the base of the cells forming the cord, most of the costal cells, and a diagonal stripe from base of stigma to Cu_{1a}, the remainder of the wing variegated with small pale spots; hind wing straw-colored except for the apex of the wing which is suffused with darker color, especially on the anterior corner. General structure typical for genus. Head bearing a stout white macrochaeta posteromesal to each lateral ocellus. Warts of scutum poorly defined. Front legs with basitarsus one and a half times length of next segment; femur elongate and slender, with a narrow brush of very short black spinules along posteromesal margin, starting at base and gradually fading out beyond the middle of the segment. Abdomen with eighth tergite similar to seventh, without posteromesal projections or brushes.

Genitalia as in figs. 2, 2*A*, and 2*B*. Ninth segment narrow ventrally, reduced to a fairly sharp angle dorsally. Cerci stout, very convex laterally, the apical margin sclerotized and broken into small black teeth, the two cerci touching on the meson at extreme base. Claspers projecting and pointing, clothed with long pale setae. Tenth tergite divided into a pair of narrow upturned lobes, heavily sclerotized at apex. Aedeagus, fig. 2*B*, with base of central process striate at base with folds of membrane; lateral arms sinuate, upturned at apex, each with a mesal fold bearing long spines, the extreme apex bearing whorls of spines and a few stouter ones at tip.

Female—Similar in size and general characteristics to male. Genitalia as in fig. 2*C*. Subgenital plate with narrow mesal tongue which is longer than lateral lobes; each of the latter broad at apex, the ventral flap occupying not more than half of the area of the lobe. Ninth sternite almost completely divided on meson to form a pair of rounded lateral lobes. Cerci elongate and somewhat pear-shaped, appressed on the meson and overlying very closely the tenth segment. Tenth segment almost completely divided into dorsal and ventral parts, the dorsal portion forming a pair of slender, curved, weak processes, concave below, the ventral portion forming a stout vasiform structure narrowed at apex, its mesal margin excavated.

Holotype, male, ODELL LAKE, OREGON, August 1, 1948, K. M. Fender (INHS).

Allotype, female, same data (INHS).

Paratypes, Pringle Falls Experiment Station, Oregon, June 7, 1935, V. E. Shelford, 1♂ (INHS); Marion Lake, Oregon, July 1, 1936, 3♂, 2♀ (D. G. Denning and INHS).

Limnephilus frijole Ross

A collection of this species from Adobe Creek, Stanislaus County, 12 miles west of Patterson, California, May 23, 1948, Hugh B. Leech, extends the range of this species from the southeastern Rockies into the Western ranges. The two California males check very well with the holotype from Texas but differ slightly, fig. 3, in having the claspers noticeably longer. Other details of the genitalia are almost identical. In the original description a quartering view is given of the inner surface of the cercus. I am including here a straight mesal view to show the relationship between the apex of the tenth tergite and the inner toothed lobe of the cercus.

This species is of more than usual interest in that characters of the genitalia indicate a fairly close relationship with *lunonus* Ross; in *frijole* the front basitarsus is very short, but in *lunonus* the front basitarsus is equal in length to the second.

Chyranda Ross

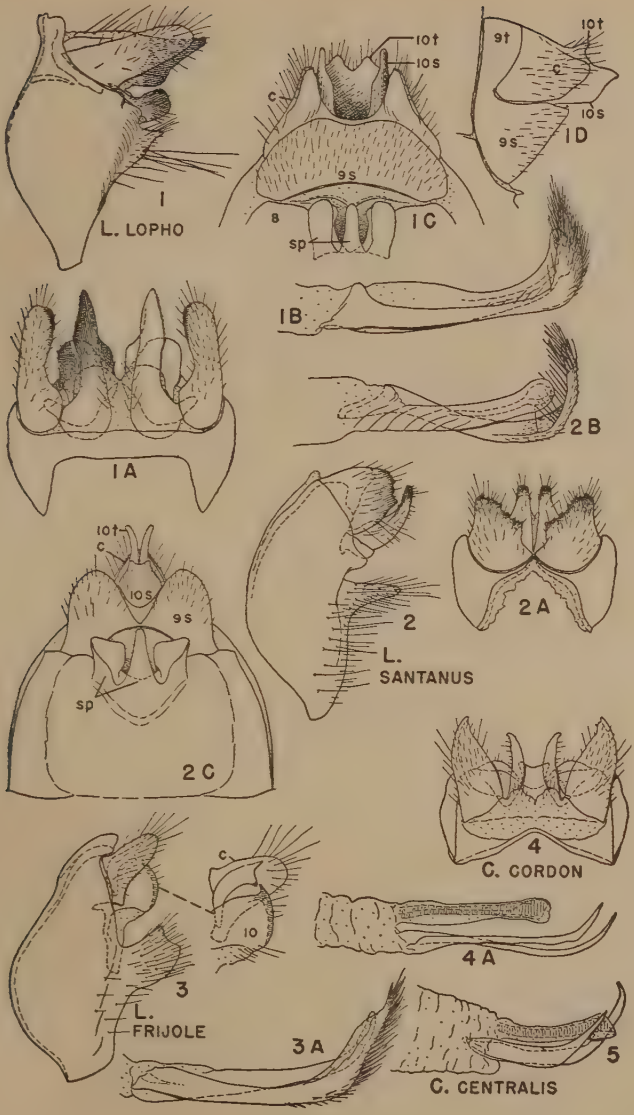
Chyranda cordon Ross, new species

The general outline of male genitalia in this species is very similar to that of *centralis* (Banks), but *cordon* differs in the slender, elongate, and similar lateral arms of the aedeagus, fig. 4*A*, and the emarginate tenth tergite and the sclerotized flanges which run lateroventrad from it; *centralis* has the two lateral arms of the aedeagus extremely asymmetrical and with the apical half sharply angled dorsad, fig. 5, and the flanges of the tenth tergite indistinct.

Explanation of Plate I

Fig. 1. *Limnephilus lopho*, male genitalia, lateral aspect; 1*A*, male genitalia, dorsal aspect; 1*B*, aedeagus, lateral aspect; 1*C*, female genitalia, ventral aspect; 1*D*, female genitalia, lateral aspect; Fig. 2. *Limnephilus santanus*, male genitalia, lateral aspect; 2*A*, male genitalia, dorsal aspect; 2*B*, aedeagus, lateral aspect; 2*C*, female genitalia, ventral aspect. Fig. 3. *Limnephilus frijole*, male genitalia, lateral aspect, inset showing mesal aspect of tenth tergite and clasper; 3*A*, aedeagus, lateral aspect. Fig. 4. *Chyranda cordon*, male genitalia, dorsal aspect; 4*A*, aedeagus, lateral aspect. Fig. 5. *Chyranda centralis*, aedeagus, lateral aspect.

Abbreviations used: *c*, cercus; *s*, sternite or sternal portion; *sp*, subgenital plate; *t*, tergite or tergal portion.


1
L. LOPHO
10t
10s
C
9s
8
sp
1C
9t
10t
C
10s
9s
1D
1B
2B
1A
10t
C
10s
9s
sp
2C
2
L.
SANTANUS
2A
4
C. CORDON
C
10
3
L.
FRIJOLE
4A
3A
5
C. CENTRALIS

Male—Length 14 mm. Color brownish-yellow throughout, the antennae slightly darker and the leg spines black. General structure typical for genus. Male genitalia similar in general proportions to those illustrated for *centralis* (Ross, 1938, fig. 45). Ninth segment reduced to a narrow strap dorsad, wide in the middle, and narrowed to a point ventrad.

Genitalia as in figs. 4 and 4*A*. Cerci large and earlike, rounded at apex; each bears a mesal, curved, bladelike process nearly as long as the outer portion, the two hinged at base but indubitably connected with each other, fig. 4. Tenth tergite represented by a large triangular plate which fills up the space between the top of the claspers and the base of the cerci, this plate not bearing the usual conspicuous paired lobes considered typical of the tenth tergite, but instead a pair of raised diagonal flanges arising near the ventrolateral corner of the sclerite and terminating at the dorsomesal corner (between the mesal processes of the cerci) in a short stout projection emarginate from dorsal view. Claspers broad and deep, appressed to the ninth segment and appearing to be only sclerites of it. Aedeagus, fig. 4*A*, with a moderately stout mesal process and with a pair of lateral processes which are almost identical in size and shape, much longer than the mesal process and upcurved at apex.

Holotype, male, PEAVINE RIDGE, MCMINNVILLE, OREGON, Station 3A, September 6, 1946, K. M. Fender (INHS).

Paratype, Beaver Cr., Mt. Hood, Oregon, August 1, 1948, K. M. Fender (INHS).

PHILOCASCA Ross

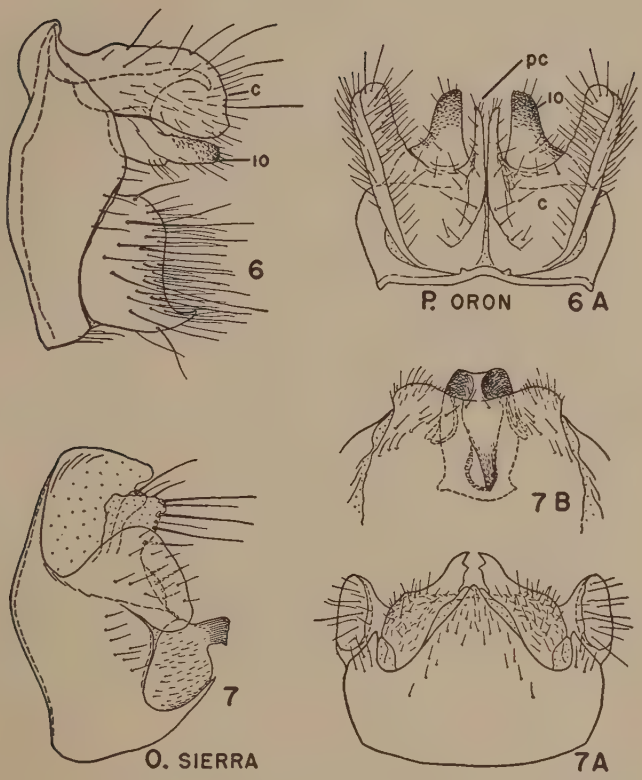
The species described below brings to three the number known in this genus. Only the males are known, and they may be separated by the following key:

KEY TO SPECIES (MALES)

1. Cerci having two pairs of mesal fingerlike processes (Denning 1941, fig. 11) ..... *banksi* (Denning)
– Cerci having only one pair of mesal processes 2
2. Mesal processes of cerci slender and fingerlike from both lateral and dorsal view and curved ventrad at tip, figs. 6, 6*A* ..... *oron* Ross
– Mesal processes of cerci slender from dorsal view, but wide and bladelike from lateral view and straight (Ross 1941, fig. 89) ..... *demita* Ross

Philocasca oron Ross, new species

Male—Length 15 mm. Color throughout light yellowish brown, the venter nearly straw color, the front wings slightly darker, many of the body hairs and most of the leg spines dark brown or black. General structure typical for genus.



EXPLANATION OF PLATE II

Fig. 6. *Philocasca oron*, male genitalia, lateral aspect; 6*A*, male genitalia, dorsal aspect. Fig. 7. *Oligophlebodes sierra*, male genitalia, lateral aspect; 7*A*. male genitalia, ventral aspect; 7*B*, female subgenital plate showing spermatheca.

Abbreviations used: *c*, cercus; *pc*, mesal process of cercus.

Male genitalia as in figs. 6 and 6A. Ninth segment narrow and straplike dorsad, only moderately wide in middle, reduced to about half its lateral width ventrad. Cerci large and irregular in outline from lateral view, the mesal process of each slender and curved ventrad at tip. Claspers large and deep, the ventral corner produced into a sharp posterior point. Tenth tergite with a pair of heavily sclerotized processes enlarging toward base and fusing almost completely with ventral portion of central part of each cercus. Aedeagus with a large ventral membranous mesal portion above which are a pair of long curved sclerotized rods which arise from a membranous socket at the base of the main portion of the aedeagus (this structure is typical for the genus).

Holotype, male, BEAR CREEK, CLATSOP COUNTY, OREGON, April 12, 1947, S. G. Jewett, Jr. (INHS).

OLIGOPHLEBODES Ulmer

Study of additional material of this genus has indicated the occurrence of interesting variations within certain species. In some cases this variation appears to be correlated with geographic distribution, on the basis of rather meagre collections at hand to date.

OLIGOPHLEBODES ARDIS Ross

An additional record of this species was obtained from Independence Pass, Colorado, Mt. Boy Park, 11,000 feet elevation, August 6, 1943, J. A. and H. H. Ross, 4♂ ♀. This distinctive species is the only one yet described in the genus in which the entire body is almost completely black.

OLIGOPHLEBODES SIGMA Milne

Dr. Knowlton has collected another record of this species from Cedar Breaks, Utah, 10,300 feet elevation, August 8, 1942, 3♂ ♀.

OLIGOPHLEBODES MINUTUS (Banks)

Available records indicate that this species is abundant in many mountain areas of Utah, Colorado, and Wyoming, and also in the Big Horn Mountains of Wyoming and the Black Hills of South Dakota. Material of *minutus* has been studied from the following localities: Colorado: Berthaud Pass (Swift Creek); Edloe (Alpine, 10,000′); Estes Park (Thompson River); Green Mt. Falls; Leadville; Rocky Mt. National Park (Cascade Lodge,

Chasm Falls, Hidden Valley Creek); Silver Plume; S. St. Vrain Creek (6 miles north of Ward, Boulder Co.). South Dakota: Hanna. Utah: Brigham Canyon; Currant Creek; Garden City; Logan Canyon (Rick's Spring, Spring Hollow, Tony Grove Camp); Mill Creek; Smithfield Canyon; Woodland. Wyoming: Big Horn Mts. (Shell Exit); Big Horn National Park (Bondi Camp, Tongue River); Fox Park; Wilson (Coal Creek).

OLIGOPHLEBODES SIERRA Ross

Some interesting material of this species, originally described from California, has been collected in Oregon and northern Wyoming. The Wyoming specimens differ from the California material (see Ross 1944, figs. 943 and 950) in having the apical tooth of the claspers more pronounced and sharper, figs. 7, 7*A*, and in having the lateral shoulder of the outer lobe of the subgenital plate much more pronounced, fig. 7*B*, occasionally even somewhat angulate. The Wyoming material was sufficiently constant that it seemed at first that it might represent a different species, but material from Oregon exhibited an almost perfect set of intergrades between the two extremes. In contrast with *minutus*, which has the wings definitely checkered with tawny and dark brown, *sierra* has the wings almost evenly yellowish brown, as is also the body. The light body will usually serve to differentiate it from *ruthae*, with which it has been taken.

Additional records of this species are as follows: California: Sequoia National Park (7,000 - 9,000′), June 23, 1929, E. C. Van Dyke, 3♂; Tulare County (Mineral King), August 4, 1923, C. L. Fox, ♂. Oregon: Mt. Hood (Horsethief Meadows) July 18, 1947, K. M. Fender, ♀ (Zigzag River) June 15, 1947, S. G. Jewett, ♂ ♀. Wyoming: Yellowstone National Park (Specimen Creek, Stations 1 and 2) August 6, 1947, J. A. and H. H. Ross, 22♂ ♀.

OLIGOPHLEBODES RUTHAE Ross

Since its original description considerable material of this species has come to hand. Some slight variation is exhibited by the claspers and also the height of the outer lobes of the genital plate. The claspers, however, are always elongate and slender, radically different from those of any other species of the genus.

Additional records include the following: Alberta: Laggan, July 10, 1925, O. Bryant, ♂. Montana: Glacier National Park,

(Many Glaciers C. G., Stream 2), July 12, 1940, J. A. and H. H. Ross, L.; Silver Gate (Soda Butte Creek), August 2, 1940, T. H. Frison, ♂. Oregon: Mt. Hood National Park (Government Camp, 4,000′), July 23, 1946, H. H. Ross, 8♂, 15♀. Wyoming: Wilson, (Coal Creek), August 12, 1940, T. H. Frison, 13♂, 2♀; Yellowstone National Park, (Dunraven Pass, Mt. Washburn), August 2, 1940, T. H. Frison, 2♀, (Specimen Creek, Stations 1, 2, 4, and 7; and small brook, Station 5), August 6 and 9, 1947, J. A. and H. H. Ross, 42♂♀.

The species is an abundant one in the northern part of the Rocky Mountain range, and early records indicated that it might be restricted to this area. The Oregon record shows, however, that its range extends westward at least into the Cascade Mountains, although it is apparently not abundant there.

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A NEW HOST RECORD FOR LEPTIDIELLA BREVIPENNIS (MULS.)

(Coleoptera, Cerambycidae)

During April, 1949, nineteen specimens of the longicorn beetle, *Leptidiella brevipennis* (Mulsant), emerged from several dead twigs of a mission fig. The infestation was confined to a backyard tree and was severe enough to be quite noticeable. This insect has not previously been reported from fig trees.

Identification of these specimens was confirmed by Dr. E. Gorton Linsley who first reported it from California (Linsley, 1933, Pan-Pac. Ent., 9:170). This insect is thought to be of southern European origin.

Dr. Linsley has subsequently reared this species several times from shaded twigs of Persian walnut as far north as Sacramento.

—Woodrow Middlekauff and Jack Underhill.

THE SPECIES OF DIANTHIDIUM OF BAJA CALIFORNIA[1]

(Hymenoptera, Megachilidae)

BY P. H. TIMBERLAKE
University of California Citrus Experiment Station, Riverside, California

In 1923, Cockerell described two new species of *Dianthidium* from Baja California. Recently, I received a small collection of *Dianthidium* collected by Ross and Bohart in that region, by means of which I am able to add two other species to the list.

DIANTHIDIUM PLATYURUM PLATYURUM Ckll.

Two males, 15 miles north of San Ignacio, September 29, 1941.

This species is represented in California by the races *baculifrons* Ckll. and *mohavense* Timb.

DIANTHIDIUM PARVUM PROFUGUM Ckll.

One male, 20 miles north of Mesquital, September 27, 1941.

On comparing this male with a cotype female from Puerto Refugio, Angel de la Guarda Island, May 1, 1921 (Van Duzee), I find close agreement. In my review (1943) of the North American species of *Dianthidium*, I placed *profugum* in a couplet with *parvum*, with the intent of distinguishing the two on the basis of a slight difference in the puncturation. This difference is so slight, however, that nobody, I am sure, could make a distinction on this basis. Moreover, the male now at hand shows that *profugum* is merely a race of *D. parvum* (Cress.).

In my key to the races of *parvum* (1943, pp. 95-96), *profugum* agrees best with the typical form. The female differs in having a very small spot on the mesopleuron, two small spots on the sixth tergite, and the maculations of the legs more extensive, as follows: stripe on front and middle femora beneath well developed, stripe on front and middle tibiae complete, but that on hind tibiae broadly interrupted by black at middle except for a narrow, connecting, pale line along posterior margin. From *D. parvum schwarzi* Timb., it differs in having the maculations paler and considerably less extensive.

[1]Paper No. 598, University of California Citrus Experiment Station, Riverside, California.

The male agrees closely with typical *parvum*. There are no stripes on the femora beneath, but merely a pale-yellow spot at apex of each femur above. A pale-yellow stripe is present on outer side of front and middle tibiae; on the hind pair only the basal fourth and a small spot at apex are yellow. The pale-yellow bands on tergites 1 to 5 are broadly and deeply excavated behind on each side, that on tergite 1 being in this manner divided into three spots, and those on tergites 3 to 5 being very narrowly interrupted medially. Tergite 6 has a very small yellow spot subapically in middle, whereas tergite 7 is entirely yellow, as usual.

Actually, therefore, *profugum* is weakly distinguishable from typical *parvum*, but as its population is isolated and probably has no connection with *parvum* except through the subspecies *schwarzi*, it may stand as a good race.

Dianthidium pudicum peninsulare Timberlake, new subspecies

This form resembles *D. pudicum consimile* (Ashm.) but the yellow maculations are paler and less extensive.

Male—Maculations moderately pale yellow, those of head and thorax becoming whiter than elsewhere, as usual. Supraclypeal mark, and mark on mesopleuron, small or absent. Stripe on front and middle femora narrow, and the yellow on hind tibiae confined to base and apex. Yellow bands of abdomen narrow in comparison with *consimile*, interrupted medially on tergites 2 to 5, and with a broad, rather deep emargination on each side behind, these emarginations almost or quite breaking through on tergite 1 and sometimes on 2. On tergites 4 and 5, the inner end of each half of the interrupted band is not distinctly broader than the outer end as it generally is in *consimile*. Length, about 7 mm.; anterior wing, 6 mm.

Described from three males from Baja California (Ross and Bohart): one, 20 miles north of Comondu, October 3, 1941 (*holotype*, No. 6122, Calif. Acad. Sci., Ent.); another, 20 miles north of Mesquital, September 27, 1941 (paratype); and the third, Cataviña, September 25, 1941 (paratype).

The male from Cataviña has the maculations nearly as bright yellow as in *consimile*, and the hind tibiae yellow on outer surface, except for a small blackish spot on anterior margin beyond the middle. An occasional male of *consimile* from southern California approaches these males from Baja California, except that the abdominal bands are broader, less emarginate, and less interrupted.

Dianthidium rossi Timberlake, new species

This form is closely allied to *D. discors* Timb., recently described from western Texas. The puncturation of the mesoscutum is twofold as in *discors*, but the coarser punctures are smaller and considerably sparser than they are in that species. In other respects the two forms are similar and may ultimately prove to be races of one species.

Female—Black, becoming dark ferruginous on tegulae, on extreme apex of femora above, and on the claw joints of tarsi. Mandibles slightly rufous at apex. Markings pale yellow, with the pattern nearly as in *discors*. Tegulae with a yellow streak on outer side, margined exteriorly with pale testaceous. Lateral marks of face broad below and extending narrowly above almost to summit of eyes. Streak behind each eye reduced to a small oval spot. Thoracic markings as in *discors*, except that the spots on anterior margin of mesoscutum are a little larger and extend from the impressed line on each side about two thirds of the way to the outer margin. Maculation of abdomen as in *discors*, except that the marks are smaller, especially the submedian marks on tergites 3 to 5, which are consequently more widely separated from each other. The two marks on tergite 5, small and roundish and similar to the lateral spots on tergite 4. Mandibles slightly narrower at apex than in *discors*, the cutting edge oblique, with no trace of a preapical notch. The very coarse punctures of frons slightly more separated than in *discors*. A rather prominent, punctureless, blister-like swelling present between the lateral and anterior ocelli on each side (similar but smaller swellings present also in *discors*). Mesoscutum duller than in *discors*, with very fine almost contiguous punctures and large widely spaced punctures. The small punctures become finer and very dense on the anterior middle. Scutellum shining, closely and strongly punctured, the punctures not all of one size but the smaller ones coarser than the fine punctures of mesoscutum. Pubescence extremely short and fine on mesoscutum, becoming most conspicuous behind the bases of the wings. Ventral scopa whitish. Wings subfuliginous, darker in the marginal cell, the nervures dark. Length, 7 mm.; anterior wing, 6 mm.

Male—Similar to the female in sculpture and markings. In addition to the markings of the female, the head has the clypeus, except apical margin, and the mandibles, except apex, yellow. Bands of abdomen considerably broader than in female and less broken into spots. The two median spots on tergite 2 generally confluent, forming three marks as on tergite 1. The bands on tergites 3 and 4 generally narrowly interrupted medially and broadly and deeply emarginate behind on each side (that on 4 sometimes broken into four spots). Tergite 5 with four small, or comparatively small, spots, the outer ones far to the sides. Tergite 7 yellow, except at base. A stripe on front and middle tibiae (some-

times extending almost to apex on middle pair but generally only to the vicinity of the middle), a mark at base of hind tibiae and a small spot (sometimes obsolete) at apex, and stripe on outer side of hind basitarsi, pale yellow. Spurs of hind coxae yellow, conical, and of the usual length in this genus. Apical corners of tergite 2 (and those of following segments successively less) flaring and appearing inflated, but the inflation not involving the whole lateral margin of the segment as in *D. singulare* and *D. cressoni*. Tergite 7 trilobed at apex, the median lobe short, a little broader than long, bluntly rounded at apex, and ending in alignment with the tips of the lateral lobes as seen from above. Lateral lobes almost square at outer corners, oblique within and thus appearing strongly divergent. Aedeagus most similar to that of *D. platyurum*, but smaller, with the dilated apical part of the stipital parameres more slender and recurved outward instead of upward. Sagittae of the same general shape and convexity above as in *platyurum*, but gradually tapering from the broad base nearly to the apex, then more rapidly, so that each component ends in a short, very fine sharp point. Apical part of sagittae with fine short pubescence on each side, quite different from the conspicuous fringe in *platyurum*. Pubescence as in female, that of the venter sparse in comparison with most of the other species. Length, 8-9 mm.; anterior wing, 7 mm.

Two females, four males (holotype female, allotype, and paratypes), CATAVIÑA, BAJA CALIFORNIA, September 25, 1941 (Ross and Bohart), types No. 6123 and 6124, Calif. Acad. Sci., Ent.

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A NEW SPECIES OF STENELMIS FROM NEVADA
(Coleoptera, Elmidae)

BY HARRY P. CHANDLER
California Division of Fish and Game, Red Bluff, Calif.

Stenelmis calida Chandler, new species

Type, male. *Size.* Length 3.3 mm; width 1.23 mm.

Form and color. Body elongate, sides parallel. Elytra dark brown; rest of body covered with dense matted greenish gray pile except tip of last abdominal segment, tarsi, mouth parts, antennae, and part of head.

Head. Vertex with a dark median band, lateral gray bands slightly narrower; palpi and antennae yellow testaceous. Antennae shorter (⅞) than pronotum.

Pronotum. (Fig. 1, a). Length 1.1 mm.; width 1.0 mm., width at anterior margin .8 mm., at posterior margin .9 mm., widest posterior third, lateral margin concave in outline in front of widest portion and slightly so behind. Median sulcus moderately deep. A deep pit on either side just in front of scutellum. Lateral tubercles conspicuous, located at the anterior 4/9 and the posterior 2/7, the posterior pair more widely separated with a depression between them and the sulcus.

Elytra. Length 2.4 mm., width 1.23 mm. Entirely immaculate. First stria complete from base to apex. Carina between second and third striae strongly and widely elevated at base. Carina between fifth and sixth striae with inner side declivous and outer side beveled, extending from base to posterior 1/7. Distance between outer carinae narrowed from base to anterior third then parallel almost to posterior end. Elytral punctures deeply impressed.

Venter. Apical emargination of last abdominal segment about equal to width of base of last tarsal segment.

Legs. Color rufous, all except tarsi covered with grey pile. Tibia length: hind 1.24 mm., middle 1.15 mm., front 1.02 mm. Last tarsal segment of the front and middle legs about 1/15 longer than the basal four segments combined. Last segment of metatarsus nearly equal to basal four segments. Last tarsal segment is more strongly enlarged beyond the middle, claws long and comparatively slender. Middle tibiae with a swelling on inner margin near middle as is characteristic of the males of this genus.

Allotype, female. Length 3.2 mm.; width 1.2 mm. Color and form similar to type except for sexual difference of the middle tibia which is without the enlargement.

Disposition of types. Holotype, allotype and *paratypes* collected by Ira La Rivers on December 31, 1946, will be placed in the collection of the California Academy of Sciences; paratypes in the collections of Mr. La Rivers, Dr. Milton Sanderson, Museum of Comparative Zoology at Harvard, U. S. National Museum, Washington, D. C., British Museum, Dr. Paul N. Musgrave and the collection of the author.

Comparisons. This species ranges in length from 3.0 to 3.4. The metathorasic wings of both sexes are reduced and non functional. They reach only to a point even with the middle of the third abdominal segment, apical third almost completely lacking so that the wing is truncate at apex. This species does not distinctly run to either the *humerosa-sinuata* group or the *crenata* group as delimited by Sanderson[1] in his key. The last tarsal segment of the front and middle legs are longer than the other tarsal segments combined, but those of the hind legs are equal. The last tarsal segment is noticeably more strongly enlarged beyond the middle, but the claws are comparatively slender. In the *humerosa-sinuata* group it will run to *S. fuscata* Blatchley in Sanderson's key. It may easily be separated from this by the prominent elevation of the interval between the base of the second and third stria of the elytra. In the *crenata* group it is separated at once by the absence of maculations on the elytra. The resemblance to the more immaculate specimens of *S. crenata* is quite close; however, there are many small differences such as the stronger enlargement of the distal half of the last tarsal segment and the reduction of the wings in *S. calida.*

Larva. The larva conforms in general with the description by West[2] of an unknown species of *Stenelmis* which he designates as Type 4. The more obvious differences are described as follows: The prothorax is nearly three times as long as the succeeding segments, the widest point being at the posterior third. Posterior abdominal segment subconical, (Fig. 1, b) slightly more narrowed at apex. Apex truncate with a short spine at marginal angles. The ventral operculum 1/3 as long as the segment. Antennae two segmented without trace of a third segment in the single specimen

[1]Sanderson, Milton W., 1938. A monographic revision of the North American Species of *Stenelmis* (Dryopidae: Coleoptera) Bull. Uni. Kan., Vol. XXXIX, 635-717.

[2]West, Luther S., 1929. A preliminary study of larval structure in the Dryopidae, Ann. Ent. Soc. Amer., Vol. XXII, p. 697.

examined. The second segment is about half as wide and one third longer than the first. The ocelli are located some distance

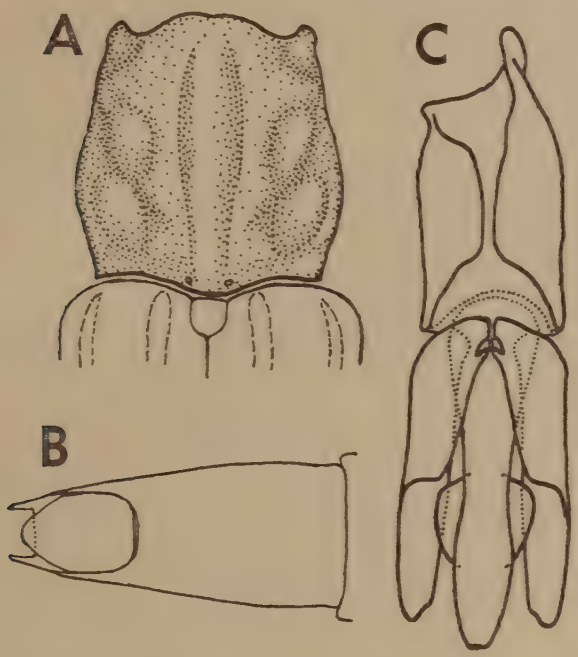

Fig. 1. *Stenelmis calida* Chandler. A. Pronotum. B. Ventral view of last abdominal segment, larva. C. Male genitalia.

below the cuticle, and the cuticle tubercles and spines are uniformly distributed over this portion of the head which may indicate that semi cave life has caused the ocelli to be less functional. Labrum evenly rounded anteriorly.

Distribution. While checking aquatic beetles in the collection of Ira La Rivers, the author discovered under another genus three specimens of *Stenelmis* from Devil's Hole, Nye County, Nevada, elevation 2,500, collected by A. W. Vanderhorst September 11,

1941, which were obviously new records for the state. As Mr. La Rivers was desirous of recording all the species occurring in the state, the specimens were carefully studied and found to be undescribed. On December 31, 1946, Mr. La Rivers visited this location and succeeded in securing a large series of adults and one larva. It was learned in correspondence with Dr. Sanderson of the Ill. Nat. Hist. Survey that he had half of a small series (10 specimens) from the same locality collected by A. R. Miller on January 9, 1939, which had never been critically studied. The other half of the series remained in the Museum of Comparative Zoology Collection. These were obtained on loan and form part of the paratypes.

Devil's Hole is located thirty miles east of Death Valley at the base of a low range of mountains on the east side of Ash Meadows in Nye County, Nevada. According to Mr. La Rivers it is a warm spring pool located at the bottom of a crevice or crater, possibly a part of a water formed cave. The crevice at the water surface is about 10 feet wide by 65 feet long. The surface of the water is 50 to 60 feet below the lowest part of the rim. There is no apparent inlet or outlet. Water marks on the walls indicate that water has stood for some time at depths of 10 to 15 feet above the present surface level. The temperature of the water never varies more than one degree from 92° Fahrenheit winter or summer. Mr. La Rivers could not find *Stenelmis* in any of the nearby streams or warm springs. Also confined to this warm spring is a small (about 20 mm.) minnow, *Cyprinodon diabolus* Wales. Both of these species may have been isolated in this warm spring since the subsidence of a prehistoric lake which covered this site probably in the early Pleistocene.[3] With the exception of *S. nubifer* Fall which occurs along the Pacific states but is not closely related to the other *Stenelmis*, this is the farthest west that this genus has been recorded. Another extension of this genus to the west was the collecting of *S. bicarinata* Lec. at Loving, New Mexico, August 5, 1945, by Mr. J. W. MacSwain.

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[3]Miller, Robert R., 1948. The Cyprinodont fishes of the Death Valley system of Eastern California and Southwestern Nevada. Misc. Pub. Mus. of Zoo., Uni. of Mich., No. 68, April 20, 1948, pp. 85-86.

NOTES ON CERAMBYCIDAE FROM THE LOWER RIO GRANDE VALLEY, TEXAS[1]

(Coleoptera)

BY GEORGE B. VOGT

University of Maryland, College Park

This paper is the fourth of a series based upon the collections made by the writer in the Lower Rio Grande Valley, Texas, during 1946 and 1947. In the annotated list that follows eighty-three species of the longhorns are given with biological notes, and in case of one species (*Leptostylus gibbulosus* Bates) apparent synonymy is brought to light.

Preparation of this paper has been aided by the encouragement and assistance of Dr. E. Gorton Linsley, Mr. W. S. Fisher, Dr. W. H. Anderson, and Dr. J. N. Knull, and the writer expresses his sincere gratitude to these workers. Determinations here treated were greatly facilitated and materially authoritated by the writer's access to the United States National Museum Collections, and to the officials at this institution the writer extends his most sincere thanks. Both Mr. L. L. Buchannan and Dr. E. A. Chapin have been especially cooperative in providing working space and facilities. And the commendable librarial assistance of Miss Mathilde M. Carpenter is gratefully acknowledged.

The localities referred to in this paper are accurately shown on the accompanying map. Unnamed localities are designated by numbers which in the text appear within quotation marks. Floral associations and topography of the localities have been treated elsewhere.[2]

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[1]Scientific article No. A221. Contribution No. 2144 of the Maryland Agricultural Experiment Station (Department of Entomology).

[2]Vogt, A Biologically Annotated List of the Buprestidae of the Lower Rio Grande Valley, Texas. Ann. Ent. Soc. Amer. (In press.)

The common names of the plants listed below occur frequently enough in the text to warrant giving their scientific equivalents here:

Brasil ..... *Condalia obovata* Hook.
Cedar Elm ..... *Ulmus crassifolia* Nutt.
Coma ..... *Bumelia celastrina* H. B. K.
Coyotillo .... *Karwinskia Humboldtiana* (R. & S.) Zucc.
Ebony ..... *Pithecolobium flexicaule* (Benth.) Coulter
Giant Opuntia ..... *Opuntia Lindheimeri* Engelm.
Goldenrod ..... *Solidagio canadensis canescens* Gray.
Guajillo ..... *Acacia Berlandieri* Benth.
Hackberry ..... *Celtis laevigata* Wild.
Huisache ..... *Acacia farnesiana* (L.) Willd.
Lote ..... *Condalia obtusifolia* (Hook.) Weberb.
Mesquite ..... *Prosopis juliflora* (Swartz) DeCandolle
Retama ..... *Parkinsonia aculeata* L.
Soapberry ..... *Sapindus Drummondii* H. & A.
Sunflower ..... *Helianthus* sp.
Tepehuaje .... *Leucaenia pulverulenta* (Schlect) Benth.
Willow ..... *Salix* sp.
Yellow top ..... *Verbesina encelioides* (Cav.) Benth. and Hook.
Yucca ..... *Yucca treculeana* Carr.

1. Stenodontes dasystomus Say

Rather common under bark of dead hackberry and occasionally willow at "8" and "10" during April, May, June, September and November; numerous emergence holes in dead trunk wood of these trees. Also a few specimens at light in Pharr and Rio Grande City.

2. Derobrachus geminatus Lec.

Six males at light in Rio Grande City during May and a dead female measuring over seventy millimeters was found at "9" on June 14. During May and June in the dry uplands north of the Rio Grande City, these beetles take to wing at dusk and are commonly seen against the horizon, but their pursuit is impossible unless one tangles with the spiny cactus and chapparal. An aberrant record was made at Pharr, when a single male was taken at light on August 7, 1947.

GULF OF MEXICO
HIDALGO
WILLACY
CAMERON
STARR
Brownsville
Santa Rosa
Mission
Pharr
Rio Grande City
El Sauz
RIO GRANDE RIVER
SCALE OF MILES
0
5
10
20

3. SMODICUM CUCUJIFORME Say

Two specimens under the bark of dead hackberry at "10" on April 14, 1946.

4. MALACOPTERUS TENELLUS Fab.

Occasionally under bark of dead hackberry at "10" during March and again in October.

5. STYLOXUS sp.

Three specimens at lights in Pharr, July 6 and August 4-15, 1947. These are not *S. fulleri* Horn or *S. texanus* Schffr.

6. ACHRYSON CONCOLOR Lec.

Frequent at lights in Pharr, May, July, and August. Also at light at "11" on September 20, 1947. Reared in July from dead cedar elm limbs collected at "10" during June. Also collected during December in huisache branches that had been pruned by *Oncideres pustulatus* Lec. Determined by Linsley.

7. ACHRYSON SURINAMUM (L.)

Numerous records under bark of recently killed hackberry, cedar elm, and mesquite at "9" and "10" during March, April and May. Also at lights in Pharr during March, April, May, and August.

8. GNAPHALODES TRACHYDEROIDES Thoms.

On fresh cut huisache, ebony, and mesquite at "4" and "6" during May and June, 1946. At lights in Pharr, May through September. And a single specimen inside a store window at Pharr on January 8, 1946.

9. CHION CINCTUS Drury

Two reared in July from soapberry branches from "8" which had been cut five months before they were caged on April 30, 1947. On February 8, 1946, one was taken on fresh cut willow and on June 1-10 and October 11, 1946, three were collected at light in Pharr.

10. PANTOMALLUS OVICOLLIS Lec.

Taken at lights in Pharr May through September.

11. EBURIA STIGMATICA Chev.

Frequent under bark of dead hackberry at "10" March through July and October. Also under bark of dead willow at "8."

12. EBURIA HALDEMANI Lec.

A single specimen under bark of a cedar elm log at "10" on May 18, 1946.

13. EBURIA MUTICA Lec.

Common at lights in Pharr, April, May, June, and September. Also two from lights in Rio Grande City on May 24, 1947. And several under loose bark of hackberry logs at "10."

14. EUSTROMULA VALIDUM Lec.

A single specimen at light near "24" on May 24, 1947.

15. ELAPHIDION INCERTUM Newn.

Two from under bark of dead willow at "10" on June 30, 1946. Two additional specimens at lights in Pharr during September, 1947.

16. ELAPHIDION COMPACTUM Casey

Five specimens at light in Pharr during May and July.

17. ELAPHIDION MIMETICUM Schffr.

Four from under loose bark of dead willow at "8," May 14-24, 1946. Also at light in Pharr during May and June.

18. ANEPYSYRA TENUE (Lec.)

Two specimens at light at "11" on August 9, 1947.

19. ANEFLUS SONORANUS Casey

A single specimen from decadent lote at "20" on June 14, 1947.

20. ANEFLUS PROTENSUS Lec.

Three specimens on dead branches of decadent mesquite at "14" and "20," June 14 - July 4, 1947.

21. ANOPLIUM MOESTUM Lec.

At light in Pharr during June, July and August. Also under bark of hackberry at "10" on July 14, 1946, and on fire killed Opuntia at "4" on June 16, 1946.

22. ANELAPHUS (probably *truncatus* (Hald.)

A single record at light in Rio Grande City on May 24, 1947.

23. PSYRASSA SALLEI Bates

One specimen beaten from soapberry coppice at "8" on September 1, 1947. Determined by Linsley.

24. PSYRASSA BREVICORNIS Linsley

Four specimens at light at "11," August 9, 1947. Determined by Linsley.

25. COMPSA PUNCTICOLLIS Lec.

A single specimen at light, Pharr, August 4-15, 1947. Determined by Linsley.

26. HETERACHTHES NOBILUS Lec.

Eight specimens at lights in Pharr April through July, again in August.

27. IBIDION EXCLAMATIONIS Thoms.

Under bark of dead *Pithecolobium pallens* (Benth.) Cory and on fresh cut ebony at "4" during June. Also, at lights in Pharr during May, June, and August.

28. OBRIUM MACULATUM Oliv.

Three reared from the same soapberry branches as Number 9, emerging on June 2 and June 25, 1947, and several emerged during late April, 1946, from the Oncideres-pruned tepehuaje branch described under 76. At lights in Pharr during May and again during August and September.

29. OBRIUM MOZINNAE Linell

Two specimens beaten from flowers and foliage of brasil on June 8, 1946 at "4."

30. OPHISTOMIS LAEVICOLLIS Bates

Five specimens on flowers of Coma at "9" on October 27, 1946.

31. LEPTURA GIGAS Lec.

Two specimens in flight, one in Donna, on May 20, 1946, and the other near willow tree at "8" on April 7, 1946. Two others were seen during May, 1947, at "8" flying about willow trees, high out of reach. Remains of unsuccessful adults have been exposed by chopping into rotten willow logs, being good evidence that their larvae bore in dead willow.

32. CALLICHROMA SCHWARTZI Fisher

Frequent on flowers of lote and *Cissus incisa* (Nutt.) Des Moulins at "6," "19," "22" and "23" April 24 through May 31. When disturbed this beautiful cerambycid emits a milky white volatile material having a fragrance similar to butyraldehyde.

33. CALLIDIUM TEXANUM Schffr.

Two specimens, from Pharr and McAllen, March 3 and 7, 1947. Both were on cedar fence posts which had been imported from northern parts of Texas.

34. PLACOSTERNUS DIFFICILIS Chev.

One of the most common Cerambycids of the area. Numerous on fresh cut mesquite at "6" and "9" during May and October and November, often in company with *Megacyllene caryae* during the fall. Frequent on fresh cut ebony at "4" during May, 1946. Swarming over fresh cut hackberry at dusk at "10" on April 7, 1946. Early in March often seen about waste citrus dumps near Pharr. At flowers of *Koeberlinia spinosa* Zucc. and guajillo at "6" during March. One emerged on September 23, 1946, from the same mesquite log described below under 35. Several also reared from a Huisache branch, which had been pruned by *Oncideres pustulatus*, emergence taking place on March 17 and May 9, 1946.

35. MEGACYLLENE CARYAE Gahan

Frequent on fresh cut mesquite in a clearing at "9" during October. Eight emerged on September 23-25, 1946, from a mesquite log which had been cut ten months previously at "4" but

not caged until August, 1946. It is interesting to compare the seasonal occurrence of this species at this locality and in the East where it is distinctly an early spring form.

36. NEOCLYTUS MUCRONATUS (Fab.)

Collected in numbers on fresh cut hackberry at "10" during March, July and October. Adults cut from old hackberry logs at "10," March 9 through June 30, 1946. Eight emerged early in July from dead cedar elm limbs collected at "10" on June 31, 1946. Common on decadent retama at "7" on June 14, 1946, and frequently observed on this host thereafter. This cerambycid was the only insect observed affecting retama except for the Bostrychids, which are impartial borers in dead wood.

37. NEOCLYTUS ACUMINATUS HESPERUS Linsley

Three collected on fresh cut *Pithecolobium pallens* (Benth.) Cory at "2" on August 31, 1946.

38. NEOCLYTUS ABBREVIATUS Schffr.

During April, 1946, five were collected from weakened *Baccharis neglecta* Nutt. six miles southwest of Pharr. A week before, also observed on fresh cut branches of the same host at "9." A single specimen emerged on June 2, 1947, from dead soapberry branches collected at "10."

39. TETRANODUS NIVEICOLLIS Linell

A single female swept from a weedy tomato field adjacent to Palm Grove at "2" on May 25, 1946.

40. EUDERCES EXILIS Casey

Frequent beating mesquite, brasil, soapberry, huisache and huisachillo (*Acacia tortuosa* (L.) (Willd.) at "4," "8" and "9" during March, April and June. Two emerged June 2, 1947, from dead soapberry branch collected at "10."

41. RHOPALOPHORA LAEVICOLLIS Lec.

Four specimens on fresh cut ebony and one on fresh cut mesquite at "4" on May 26 and June 2, 1946. Also on fresh cut mesquite at "9" on October 13, 1946, and on brasil at "4" on June 8, 1947. One specimen on flowers of *Baccharis neglecta* Nutt. at "2" on September 30, 1946.

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